

CLAIMS:

1. A process for the production of plate-like alumina particles comprising the steps of:
forming a mixture of nano-sized particles of an aluminium precursor compound and a sufficient volume fraction of a diluent; and
heat treating the mixture to form substantially discrete plate-like alpha alumina particles dispersed in the diluent, characterised in that the step of heat treating the mixture is conducted below the melting point of the diluent.
2. A process for the production of plate-like alumina particles according to claim 1 further comprising the step of removing the diluent after the step of heat treating.
3. A process for the production of plate-like alumina particles according to claim 2 wherein the diluent is soluble in a solvent and the step of removing the diluent from the mixture comprises the step of washing with the solvent after the step of heat treating.
4. A process for the production of plate-like alumina particles according to claim 3 wherein the solvent is water or an alcohol.
5. A process for the production of plate-like alumina particles according to any one of the preceding claims wherein the sufficient volume fraction of the diluent is at least 80% of the total volume of the mixture.
6. A process for the production of plate-like alumina particles according to any one of the preceding claims wherein the diluent is a metal salt.
7. A process for the production of plate-like alumina particles according to claim 6 wherein the metal salt is selected from the group comprising; sodium sulphate,

potassium sulphate and/or sodium chloride.

8. A process for the production of plate-like alumina particles according to any one of the preceding claims further comprising the step of adding a mineraliser to the diluent to form a diluent-mineraliser system.
9. A process for the production of plate-like alumina particles according to claim 8 wherein the mineraliser is a metal fluoride.
10. A process for the production of plate-like alumina particles according to claim 8 wherein the metal fluoride is selected from the group comprising further comprising; sodium fluoride, calcium fluoride, aluminium fluoride and/or sodium aluminium fluoride.
11. A process for the production of plate-like alumina particles according to any one of claims 8 to 10 wherein the step of heat treating the mixture is conducted below the liquidus of the diluent-mineraliser system.
12. A process for the production of plate-like alumina particles according to any one of the preceding claims wherein the aluminium precursor compound is selected from the group comprising; aluminium hydroxide, aluminium sulphate, aluminium nitrate and/or aluminium chloride.
13. A process for the production of plate-like alumina particles according to any one of preceding claims wherein the nano-sized particles of the alumina precursor compound are substantially discrete.
14. A process for the production of ultrafine plate-like alumina particles having a high aspect ratio comprising the steps of:
milling a mixture of an aluminium precursor compound and a sufficient volume fraction of a diluent to form a dispersion of nano-sized particles of an intermediate

aluminium compound in the diluent; and,

thereafter heat treating the dispersion to convert the nano-sized particles of the intermediate aluminium compound to substantially discrete plate-like particles of alpha alumina.

15. A process for the production of plate-like alumina particles according to claim 18 further comprising the step of removing the diluent from the mixture after the step of heat treating.
16. A process for the production of plate-like alumina particles according to claim 19 wherein the step of removing the diluent comprises the step of washing with a solvent which selectively dissolves the diluent while not reacting with the plate-like alumina particles.
17. A process for the production of plate-like alumina particles according to any one of claims 18 to 20 wherein the precursor aluminium compound is aluminium hydroxide or aluminium oxide.
18. A process for the production of plate-like alumina particles substantially as herein described with reference to and as illustrated in any one of the Examples 3 to 5.
19. A process for the production of plate-like alumina particles substantially as herein described with reference to and as illustrated in any one of the Figures 3 to 7.